10/616,303

Exhibit A

US006725356B2

(12) **United States Patent**
Hansen et al.

(10) **Patent No.: US 6,725,356 B2**
(45) **Date of Patent: *Apr. 20, 2004**

(54) **SYSTEM WITH WIDE OPERAND ARCHITECTURE, AND METHOD**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: 09/922,319

(22) Filed: Aug. 2, 2001

(65) **Prior Publication Data**

US 2002/0133682 A1 Sep. 19, 2002

Related U.S. Application Data

(60) Continuation of application No. 09/382,402, filed on Aug. 24, 1999, now Pat. No. 6,295,599, which is a continuation-in-part of application No. 09/169,963, filed on Oct. 13, 1998, now Pat. No. 6,006,318, which is a continuation of application No. 08/754,827, filed on Nov. 22, 1996, now Pat. No. 5,822,603, which is a division of application No. 08/516,036, filed on Aug. 16, 1995, now Pat. No. 5,742,840.

(60) Provisional application No. 60/097,635, filed on Aug. 24, 1998.

(51) **Int. Cl.**[7] **G06F 15/00**

(52) **U.S. Cl.** **712/210**; 712/28; 712/24; 712/32; 712/208

(58) **Field of Search** 712/32, 28, 34, 712/208, 210, 20, 24

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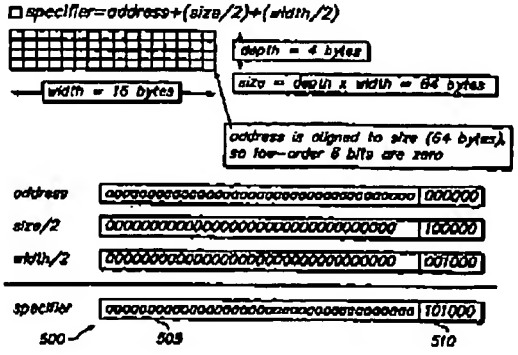
(57) **ABSTRACT**

The present invention provides a system and method for improving the performance of general purpose processors by expanding at least one source operand to a width greater than the width of either the general purpose register or the data path width. In addition, the present invention provides several classes of instructions which cannot be performed efficiently if the operands are limited to the width and accessible number of general purpose registers. The present invention provides operands which are substantially larger than the data path width of the processor by using a general purpose register to specify a memory address from which at least more than one, but typically several data path widths of data can be read. The present invention also provides for the efficient usage of a multiplier array that is fully used for high precision arithmetic, but is only partly used for other, lower precision operations.

48 Claims, 148 Drawing Sheets

Microfiche Appendix Included
(5 Microfiche, 63 Pages)



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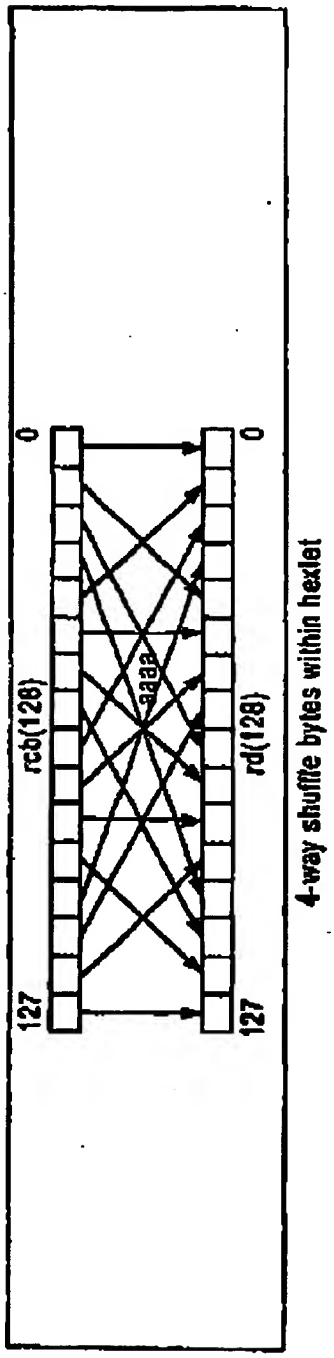

FIG. 34D

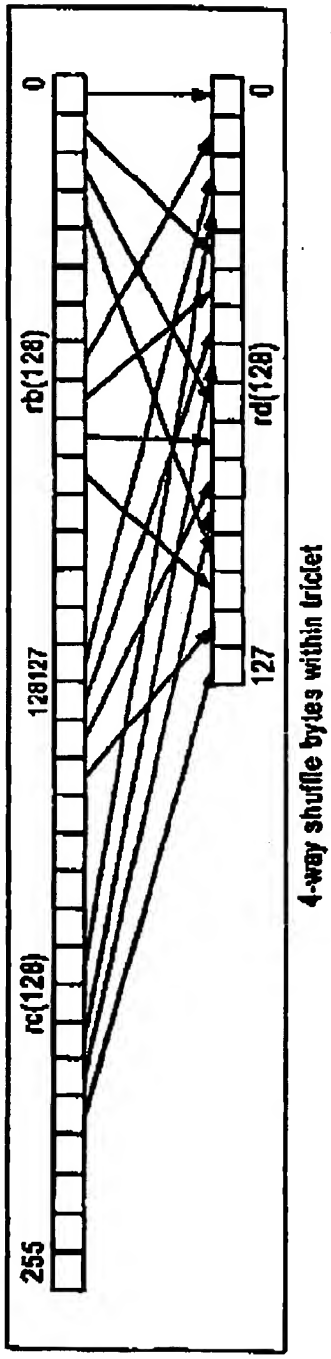

FIG. 34E